AFOSR-TR. 69-0255

FINAL REPORT OF

THE GORDON RESEARCH CONFERENCE ON MULTIPHOTON PROCESSES
COLBY-SAWYER COLLEGE, NEW LONDON, NEW HAMPSHIRE

13-17 JUNE 1988

Grant Number AFOSR & 8-0 20/

Philip M. Johnson, Chairman Department of Chemistry State University of New York Stony Brook, NY 11794 Peter Lambropoulos, Vice-Chairman Department of Physics University of Southern California Los Angeles, California 90007

Submitted to:

Air Force Office of Scientific Research Attention: Dr. Ralph E. Kelley

Submitted by:

Name:

Alexander M. Cruickshard

Philip M. Johnson

Signature:

Date:

Title:

Director, Gordon

Conferences

Professor

Address:

Gordon Research Center

University of Rhode Island

Kingston, RI 02881-0801

Department of Chemistry S.U.N.Y. at Stony Brook

Stony Brook, NY 11794

Telephone:

(401) 783-4011, 783-3372

(516) 632-7912

The Fourth Gordon Research Conference on Multiphoton Processes was held at Colby-Sawyer College, New London, New Hampshire during the week 13-17 June 1988. The program of the Conference consisted of 21 invited talks, 64 contributed poster papers, and 7 brief oral "featured poster" presentations, which were chosen from among the contributed poster papers. In the tradition of Gordon Research Conferences, the scientific sessions were scheduled for mornings and evenings, leaving the afternoons free for discussions and/or recreational activities. The oral sessions were shortened on Monday and Wednesday evenings to allow for the late evening poster sessions. All of the oral sessions were well-attended (the sessions averaged over 100 attendees) and the two poster sessions were very successful. Particularly lively discussion was in evidence at most of the sessions, resulting in many clarifications of differing points of view. An example of a heated debate was one concerning the importance of third harmonic generation in low order multiphoton ionization processes.

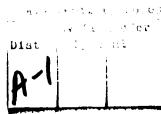
The program of the Conference covered all aspects of Multiphoton Processes in atoms and molecules. There were sessions devoted to multiphoton ionization of atoms, multiphoton ionization in intense laser fields, multiphoton ionization and dissociation processes in small molecules, multiphoton dissociation processes in larger molecules (including picosecond processes), and general interest sessions. The complete Conference program is appended.

The Conference was attended by 112 scientists from the U.S., Canada,

Europe, and Japan. This indicates that the conference is continuing to grow
in attendance. Previous totals were 54 in 1982, 85 in 1984, and 105 in

1986, which can be attributed to the growing size of the Multiphoton





For

community and to the supplemental funding that the Conference has received from the National Science Foundation and from the Air Force Office of Scientific Research, as well as some contributions from the laser industry (Lambda Physik and Spectra Physics). A complete list of attendees is appended.

The next Conference in this series will be held in 1990. The Chairperson will be Professor Peter Lambropoulos of the Department of Physics, University of Southern California, and the vice-chairman will be Professor Tomas Baer of the Department of Chemistry, University of North Carolina. This pairing continues the tradition of having both physics and chemistry represented in the officers to provide a balanced program.

The Conference budget of \$23,200 (\$10,200 from the Gordon Research Conferences, \$6,000 from the Air Force Office of Scientific Research. \$5,000 from the National Science Foundation, and \$1000 each from Lambda Physik and Spectra Physics) was distributed in the following manner. The Conference registration fee, which included room and board for the week, was paid for all 27 Invited Speakers and Discussion Leaders. Partial travel support was granted to the Chairperson (who was also a Discussion Leader) and to the 16 of the Invited Speakers and Discussion Leaders; these disbursements amounted to \$14,640 or 63% of the total budget. The Conference registration fee was also partially paid for 12 graduate students; these disbursements amounted to \$2840, 12% of the total budget. Finally, partial travel and lodging support was given to 16 other attendees, 5 of whom were from Europe; these disbursements amounted to \$5,710 or 25% of the total budget. In summary, 55 attendees received partial support to attend the Conference, with a significant fraction of the budget used to support graduate students, postdoctoral appointees, and young scientists from the U.S. and abroad.

GORDON RESEARCH CONFERENCES

Colby-Sawyer College, South Site New London, NH

MULTIPHOTON PROCESSES June 13, 1988

Registration List

A. C. Albrecht Abbey 210 Cornell University Department of Chemistry, Baker Lab Ithaca, NY 14853-1301

Sarah W. Allendorf Colby 304
Stanford University
Department of Chemistry
Stanford, CA 94305

Scott Anderson Colby 106
Stony Brook--SUNY
Chemistry Dept.
Stony Brook, NY 11794-3400

Jeffrey R. Appling Abbey 214 Univ. of Kentucky, Dept. Chemistry 125 Chemistry-Physics Bldg. Lexington, KY 40506-00551

Tomas Baer Abbey 201 Univ. of North Carolina Chemistry Dept. Chapel Hill, NC 27599-3290

Mark Bashkansky Colby 104 AT&T Bell Laboratories 600 Mountain Avenue Murray Hill, NJ 07974

Joel M. Berman Non-Res. Rutgers Univ., Dept. Chemistry Wright-Rieman Labs Piscataway, NJ 08854

Therese Biernacki Colby 301 Sandia National Laboratories Division 8354 Livermore, CA 94550

Perry R. Blazewicz Colby 104 Oak Ridge National Laboratory P.O. Box 2008 Bldg. 450CS, MS142 Oak Ridge, TN 37831 Patrick R. Callis Colby 102 Montana State University Dept. of Chemistry Bozeman, MT 59717

Francis X. Campos McKean 2
Purdue University
Dept. of Chemistry
West Lafayette, IN 47907

Joseph Chaiken Abbey 202 Syracuse Univ. Dept. of Chemistry Syracuse, NY 13244-1200

D. Charalambidis Abbey 309
Research Center of Crete
Iraklion P.O. Box 1527
Crete, GREECE

Kuei-Hsien Chen Colby 101 Harvard Univ. Division of Applied Science 9 Oxford St. Cambridge, MA 02138

William A. Chupka Colby 103
Yale Univ.--Sterling Chem. Lab.
225 Prospect Street
New Haven, CT 06511

Steven D. Colson Abbey 107
Yale Univ.--Dept. of Chemistry
225 Prospect Street, P.O. Box 6666
New Haven, CT 06511

Robert N. Compton Abbey 105 Oak Ridge National Lab. P. O. Box X Oak Ridge, TN 37831-6825 Patricia M. Dehmer Non-Res. Argonne National Lab. 9700 S. Cass Avenue Bldg. 203-C153 Argonne, IL 60439

Paul L. DeVries Page 206 Miami Univ. Dept. of Physics Oxford, OH 45056

Louis F. DiMauro Abbey 209 Brookhaven National Lab. Dept. of Chemistry Upton, NY 11973

Sham N. Dixit McKean 11 Lawrence Livermore National Lab. P.O. Box 808, L-401 Livermore, CA 94550

Richard L. Dubs California Institute of Technology 127-72 Noyes Lab. Pasadena, CA 91125

Mark Dugan McKean 6 Cornell Univ.--Dept. Chemistry Box 79 Baker Lab. Ithaca, NY 14853

John M. Dyke Colby 103
The University, Dept. of Chemistry
Highfield
Southampton, UK 509 5NH

Takayuki Ebata McKean 8
Tohoku Univ.
Dept. ov Chemistry, Fac. of Science
Sendai, JAPAN

Dan Elliott McKean 7
Purdue Univ.
School of Electrical Engineering
West Lafayette, IN 47907

Edward Eyler Abbey 205 Yale Univ., Physics Dept. 217 Prospect St. New Haven, CT 06511

Michael G. Fink Abbey 216 Univ. of Colorado JILA P.O. Box 0440 Boulder, CO 80309-0440 C. Fotakis Abbey 309
Research Center of Crete
Iraklion POb 1527
Crete, GREECE

Richard R. FreemanAbbey 212 AT&T Bell Labs. LE-338 Murray Hill, NJ 07974

W. Ray Garrett & WIFE Colby 212 Oak Ridge Nat. Lab. P.O.Box 2008 Bldg. 5500, M5378 Oak Ridge, TN 37831-6378

M. Gavrila Page 208
F.O.M. Inst. for Atomic & Mole. Physics
Postbus 41 883
1009 DB Amsterdam, THE NETHERLANDS

Abrahim Ghelichkham McKean 6 Purdue Univ. Dept. of Chemistry West Lafayette, IN 47907

Jonathan M. Gilligan Yale Univ., Physics Dept. 217 Prospect St. New Haven, CT 06511

Wallace L. Glab McKean 12 Argonne National Lab. Chemistry Division, Bldg. 200/K-121 9700 S. Cass Avenue Argonne, IL 60439

Lionel Goodman & RUTH Colby 207 Rutgers Univ. Chemistry Dept. New Brunswick, NJ 08903

Russell D. Johnson III Colby 204 National Bureau of Standards Chemical Kinetics Division Gaithersburg, MD 20899

Ed Grant Abbey 302 Purdue University Dept. of Chemistry West lafayette, IN 47907

Kenneth Haber Page 303
Purdue University
Dept. of Chemistry
West Lafayette, IN 47907

Gregory Hall Page 302
Savannah River Lab
Environmental Technology Division
Bldg. 735A
Aiken, SC 29808

Susan J. Hillenbrand Colby 310
SUNY at Stony Brook
Dept. of Chemistry
Stony Brook, NY 11778

Jeanne M. Hossenlopp Colby 302 Columbia Univ., Dept. Chemistry Havemeyer Box 256 New York, NY 10027

Mitsuo Ito Page 210
Tohoku University
Dept. of Chemistry
Sendai 980, JAPAN

Yaman Jiang McKean 5
Purdue Univ.
Dept. of Chemistry
West Lafayette, IN 47907

Philip M. Johnson Abbey Suite SUNY Stony Brook Dept. of Chemistry Stony Brook, NY 11794

Jungen Christian Abbey 112 Lab. Photophysique Moleculaire Universite Paris--Sud 91400 Orsay, FRANCE

Katsumi Kimura Page 210 Institute for Molecular Science Myodaiji, Okazaki, JAPAN 444

Peter M. Koch
Physics Dept.
State Univ. of NY at Stony Brook
Stony Brook, NY 11794-3800
B.g. Koenders
Free University
Dept. of Physical Chemistry
De Boelblaan 1083
Amsterdam, NETHERLANDS 1081 HV

Kenneth C. Kulander Page 304 Lawrence Livermore National Lab. P.O. Box 5508 L-438 Livermore, CA 94550 Ken Lagattuta Page 300 Los Alamos National Laboratory Group X-7, Mail Stop B257 Los Alamos, NM 87545

P. Lambropoulos Colby 100A Univ. of So. Calif. Physics Dept. Los Angeles, CA 90089-0484

C. A. de Lange McKean 1
Free University
Dept. of Physical Chemistry
De Boelelaan 1-83
Amsterdam, THE NETHERLANDS 1081 HV

Leping Li McKean 9
Yale Univ., Dept. Chemistry
225 Prospect Street
New Haven, CT 06511

Robert Lipert Abbey 301
Yale Chemistry Dept.
225 Prospect St.
New Haven, CT 06511

Louis-Andre Lompre Abbey 213
CEA Saclay
Sevice de Physique des Atomes
et des Surfaces
Gif Sur Yvette, FRANCE 91191

Cheng-zai Lu Colby 203 Harvard Univ. Division of Applied Sciences Boston, MA 02138

Ruth McDiarmid Colby 302 National Institutes of Health Bldg. 2, Room Bl-D7 Bethesda, MD 20892

Vincent McKoy McKean 11 California Institute of Technology Noyes Lab. of Chemical Physics Mail Code 127-72 Pasadena, CA 91125

John C. Miller Page 301 Oak Ridge National Lab. P.O. Box X Oak Ridge, TN 37831-6125

Paul J. Miller Colby 106 Yale Univ., Dept. Chemistry P.O. Box 6666 New Haven, CT 06511-8118 Robert J. Miller Abbey 303
Yale Univ., Dept. Chemistry
P.O. Box 6666
New Haven, CT 06511

K. Muller-Dethlets Page 308
Technische Universitat Munchen
Inst fur Physikalisch Chemie
Lichtenbergstr. 4
D-8046 Garching, WEST GERMANY

Didier Normand Abbey 213
CEN Saclay
DPHG/SPAS
Gif-Sur-Yvette, FRANCE 91191

Thomas M. Orlando Page 207
State Univ. of New York @ Stony Brook
Dept. of Chemistry
Stony Brook, NY 11794

Charles E. Otis Page 303
IBM Corporation
Ultra-Fast Laser Lab Dept T37
Bldg 257-3
Endicott, NY 13760

Liwen Pan Colby 201 University of Maryland/NBS Bldg. 221, Rm. A251 National Bureau of Standards Gaithersburg, MD 20899

Seung Min Park McKean 9
Brown University
Dept. of Chemistry
Providence, RI 02912

Evdokia Patsilinakou Colby 309
Research Center of Crete
Institute of Electronic Struc & Laser
P.O. Box 1527
71110 Iraklion, GREECE

Dr. Petite Abbey 202
CEA
DPHG/SPAS-CEN Saclay
Gif Sur Yvette, FRANCE 91191

Stephen T. Pratt Page 305 Argonne National Lab. Bldg. 203 C-141 9700 S. Cass Avenue Argonne, IL 60439 Detlev Proch Page 204 MPI Fuer Quantenoptik Postfach 1513 Garching, WEST GERMANY 8046

Martin Quack Page 202 ETH Zurich (Zentrum) Lab. F. Physical Chemistry CH-8092 Zurich, SWITZERLAND

Yvon Rebiere McKean 6 Cornell Univ., Dept. Chemistry Baker Lab. Ithaca, NY 14853

Eberhard Riedle Page 201 Institut fur Physikalische Chemie Technische Universitat Munchen Lichtenbergstr 4 D-8046 Garching, WEST GERMANY

Steven A. Rogers Abbey 216 Univ. of Colorado Jila Box 440 Boulder, CO 80309-0440

Henrik Rudolph Page 205
Cal Tech
127-72 Noyes
Pasadena, CA 91125

Steven P. Sapers Page 200 Univ. of Colorado Campus Box 215 Boulder, CO 80309-0215

Gottfried T. Schappert Page 203 Los Alamos National Laboratory E-526 Los Alamos, NM 87544

Hisanori Shinohara Page 209 Institute forMolecular Science Myodaiji, Okazaki, JAPAN 444

Mary Jane Shultz Colby 303 Tufts University, Chemistry Dept. 77 Talbot Ave. Medford, MA 02155

Uzy Smilansky Abbey 305 Weizmann Inst. of Science Rehovot, ISRAEL 76100 Mark A. Smith Abbey 204
University of Arizona
Dept. of Chemistry
Tucson, AZ 85721

Kermit C. Smyth Abbey 307 National Bureau of standards Bldg. 224, Room B250 Gaithersburg, MD 20899

Spyros Spyrou Page 207 National Hellenic Research Foundation 48 Vas Constantinou Ave. Athens, GREECE 11635

Anthony F. Starace Abbey 316
The University of Nebraska
Dept. of Physics & Astronomy
260 Behlen Lab.
Lincoln, NE 68588-0111

Jeffrey Stephens McKean 10 California Institute of Technology Dept. of Chemistry, MC127-72 Pasadena, CA 91125

S. Suckewer & SON Page 101
Princeton University, PPL
Forrestal Campus
Princeton, NJ 08543

Abha Sur Colby 309
Mount Holyoke College
Dept. Chemistry, Carr Laboratory
South Hadley, MA 01075

Toshinori Suzuki Page 209 Tohoku Univ., Dept. Chemistry Fac. of Science Sendai, JAPAN 980

Jack A. Syage. Abbey 314
The Aerospace Corporation
PO Box 92957, Mail Stop MS-754
Los Angeles, CA 90009

Xian Tang Abbey 301 University of Southern California Dept. of Physics Los Angeles, CA 90089-0484

David Theiste Colby 102
Montana State University
Dept. Chemistry
Bozeman, MT 59717

Paul Tjossem Colby 209 National Bureau of Standards Building 224, Room B258 Gaithersburg, MD 20899

Russell Tonkyn Page 212 Brookhaven Nat'l Lab. Chemistry Dept. Upton, NY 11973

R. D. Verma Colby 214
Yale Univ., Dept. Chemistry
P.O. Box 6666
New Haven, CT 06511

J. W. J. Verschuur Abbey 204
FOM--Institute for Atomic & Molecular
Physics
Kruisban 407
1098 SJ Amsterdam, THE NETHERLANDS

Jyhpyng Wang Colby 101 Harvard University 9 Oxford St. Cambridge, MA 02138

James C. Weisshaar Abbey 312 University of Wisconsin Dept. Chemistry 1101 University Avenue Madison, WI 53706

John WesselAbbey 310 The Aerospace Corporation P.O. Box 92957 Los Angeles, CA 90009

Michael G. White Abbey 308 Brookhaven National Lab. Chemistry Dept. Upton, NY 11973

Ralph Wiedmann Page 212
Purdue University
Dept. of Chemistry
West Lafayette, IN 47907

J. W. Winniczek Abbey 306 Brookhaven National Lab. Chemistry Dept. Upton, NY 11973

Ming Wu Page 306 SUNY at Stony Brook Dept Chemistry Stony Brook, NY 11794 Baorui Yang Page 306 SUNY at Stony Brook Dept. of Chemistry Stony Brook, NY 11794

Mei-Wen Yen Colby 310
State Univ. of New York @ Stony Brook
Chemistry Dept.
Stony Brook, NY 11794

Lawrence D. Ziegler Abbey 304 Northeastern Univ., Dept. Chemistry 360 Huntington Avenue Boston, MA 02115

Peter Zoller McKean 7 BILA, University of Colorado Boulder, CO 80309

Josef W. Zuamziger McKean2
Purdue University
Dept. of Chemistry
West Lafayette, IN 47907